suspension of 30,000 to 40,000 feet. This is the equivalent of steel of about 100,000 pounds tenacity. Could the cast portions of the steam-engine be made in this material for our torpedo-boats or aëronautic and automobile machinery their weights would be reduced about one-half. It remains to be seen whether, the costs permitting, this change would be to any extent practicable. Dynamos have been constructed, in the shops of Sibley College, of aluminium and a gain thus secured for portable and automobile work of some importance, and it is possible that magnesium, with its higher tenacity and greater lightness, may prove the coming material for some such work. Costs will undoubtedly fall rapidly with increasing area of market.

R. H. THURSTON.

SCIENTIFIC BOOKS.

La constitution du monde. By MADAME CLÉMENCE ROYER. Published by Schleicher Frères, 15 Rue des Saints-Pères, Paris. Containing 799 pages, 100 chapters, 92 figures, and 4 plates.

This pretentious volume is claimed by its author to contain a new and satisfactory philosophy of nature including everything from the geometrical structure of molecules to a theory of the evolution of worlds. In a somewhat remarkable preface the author expresses in forcible terms her contempt for those philosophers who maintain that certain things are unknowable, and asserts that their speculations were advanced to enslave the minds of men and support the dogmas of theologians. The following quotations of remarks concerning scientific subjects will indicate her attitude of mind: "The kinetic theory of gases is certainly a romance conceived by the imagination of a German mathematician." The non-euclidian geometries "founded on sophistic generalizations of analysis * * * have for their result and their end, the clouding of the intellect in undermining the foundations of rational certitude, to the profit of those who are attempting to reduce mankind * * * to the *credo quia absurdum* of blind and unquestioning faith."

The ideas advanced upon scientific questions are not worth the space that it would require to enumerate them, much less to make any critical comments. They indicate, as is in reality confessed in the preface, that the author has read, though widely, with a mind strongly biased by preconceived notions, and they show at every point a lamentable lack of scientific training and spirit. The contents of the 99th chapter are sufficient to illustrate the statement. The author in her 'evolution du monde' supposes that at some remote time a planet from exterior space struck Saturn a glancing blow greatly accelerating its rotation; that the Saturnian oceans and portions of the solid crust were hurled off and formed the rings, which are ice, or perhaps aluminium; that the striking planet was broken up forming the satellites of Saturn, Jupiter, Uranus, Neptune, Mars, and the Moon, the asteroids, the meteor streams; that Venus and Mercury have no satellites because they were on the opposite side of the sun when the collision occurred; that the Moon and the satellites of Mars move with less linear velocity than those of the larger planets because they are so far from Saturn that the velocities of the flying fragments had largely died out before they reached their respective primaries; and that the second satellite of Mars 'by a remarkable exception does not fulfill the laws of Kepler.' The figure inserted in the chapter makes the theory very clear.

It is to be regretted, for the sake of the author who devoted so much time to writing the book, and for the sake of Madame Valentine Barrier who bore the expense of its publication, that it is impossible to say that the work is worth reading. F. R. M.

The Chemistry of Soils and Fertilizers. By HARRY SNYDER, B.S., Professor of Agricultural Chemistry, University of Minnesota, and Chemist of the Minnesota Agricultural Experimental Station, Easton, Pa. The Chemical Publishing Company. 1899. 12mo. ix + 277 pp. Price, $1.50.

This book is the outgrowth of courses of instruction given at the University of Minnesota

"to classes of young men who intend to become farmers, and who desire information that will be of assistance to them in their profession." It aims to give "the principles of chemistry which have a bearing upon the conservation of soil fertility and the economic use of manures." The author has performed his task in a very satisfactory manner. He has treated the subject logically and systematically, giving first the scientific principles, and then laying stress on their practical application, but not to such a degree as to make the work a hand-book instead of a text-book. The historical development of the subject has not been neglected, though naturally the treatment has been very condensed.

Notwithstanding the general excellence of the work, there are certain errors and defects which cannot be overlooked. The language is, at times, too condensed for clearness, as, for example, in the description of the analysis of soils on page 74. The writer has a habit of leaving out the comma in sentences like these, 'that produced from cellulose bodies as sawdust,' 'produced by each material as green clover, oat straw.' It is stated on page 42 that "the additional amount of water in the humus soil may cause the soil temperature to be lower than that of the sandy soil. While the humus soil absorbs more heat than the sandy soil, the heat is used up in evaporating water." The heat is used up in warming the water, more than in evaporating it; the specific heat of soils being from 0.2 to 0.4, as stated in the next paragraph. On page 93 the statement is made that, "the non-nitrogenous compounds as cellulose, starch and sugar undergo a fermentation but seem to possess little, if any, power to form humates in the soil." And the third sentence reads, "straw, sawdust and sugar, materials rich in cellulose and other carbohydrates, yield a humus characteristically rich in carbon and poor in nitrogen." These statements appear inconsistent. The table on page 94 is not correctly arranged. On page 115 the statement is made, "like the nitrates and nitrites, the ammonium compounds are all soluble and hence cannot accumulate in soils which receive an average amount of rainfall." This leaves a false impression, for ammonium compounds are fixed by soils almost as readily as potash, becoming soluble with difficulty (1 part in 10,000 of water), while the nitrate and nitrites are not fixed, but wash out with great readiness. The fact that ammonium salts are fixed by the soils is not mentioned in the chapter on fixation.

This book is, on the whole a very good one; it is cordially recommended to the attention of all instructors in agricultural chemistry, and, while not written with this end in view, it is recommended to those agricultural chemists who desire to obtain a survey of the rapidly widening field of research relating to soils and fertilizers.

G. S. FRAPS.

A Short History of the Progress of Scientific Chemistry in our own Times. By WILLIAM A. TILDEN, D.Sc., F.R.S. Longmans, Green & Co., London, New York, and Bombay. Pp. x + 276.

The task which Dr. Tilden set before himself in the preparation of this book was to give in broad outline a sketch of the development of chemistry during the period of the Victorian era. The subject has been treated topically rather than chronologically, and the method of treatment chosen is abundantly justified in the result. The topics selected are: Matter and Energy; The Chemical Elements; Atomic Weights; Classification of the Elements; Valency and the linking of Atoms; Synthetical Chemistry; Stereo-chemistry; Electricity and Chemical Affinity; Liquefaction of Gases. An exhaustive historical treatment of these topics does not, of course, lie within the scope of the work. Indeed, its value depends very greatly on the fact that the author has known so well what to select, and because the topics selected have been treated with sufficient fullness to be interesting and intelligible to any one possessing an elementary knowledge of the subject. The book should find a large field of usefulness.

W. A. NOYES.

Outlines of Industrial Chemistry. By FRANK HALL THORP, Ph.D., Instructor in Industrial Chemistry in the Massachusetts Institute of Technology. A text-book for students. New Edition revised. New York, The Macmillan Company. 1899. Pp. xvii + 541. Price, $3.50.